SUBJECT INDEX

A

Abrasive:
costs . . . 689
operations in foundry cleaning room . . . 685-691
wheel speeds . . . 687
Abrasives for cleaning castings . . . 455
Acid electric:
heats . . . 472-473
steelmaking, Manganese recovery in . . . 471-491
steel melting practice, Refractory practice in . . . 359
Acid steel practice, Low FeO double slags in . . . 480
Administration of a business . . . 627
A.F.S. Research Reports:
A Study of the Principles of Gating . . . 76-107
Surface Hardening of Pearlitic Malleable Irons . . . 108-121
Melt Quality and Fractures Characteristics of 85-5-5-5 Read Brass . . . 122-132
Tenth Annual Report on the Investigation of Steel Sands At Elevated Temperatures . . . 133-143
Report on A.F.S. Steel Division Research Project . . . 144-146
Influence of Dry Sand Conductivity on Rate of Freezing of Steel Slabs . . . 147-152
Aging charactertistics of aluminum alloys . . . 335, 525
Aging of magnesium alloy . . . 748
Agraphatic carbon in malleable iron . . . 578, 580
Air furnace, Melting in . . . 2
Air tools, Portable, in foundry cleaning rooms . . . 510-514
Airless blast cleaning . . . 450
Albany sand (natural clay bond) . . . 415
Alloy for pattern shops . . . 718-719
Alloys, Aluminum casting . . . 69
Aluminum:
additions in commercial yellow brass . . . 423-428
Boron for grain refining . . . 29
British casting practice . . . 20
Centrifugal casting . . . 35
Degasification of . . . 27
fluxes . . . 28
grain refinement mechanism . . . 28, 30
Gravity die (permanent mold) casting . . . 33
heat treatment . . . 34, 35
Hexachlorethane for grain refinement . . . 29
melting furnace . . . 30
melting practice . . . 26
Niobium for grain refining . . . 24, 29, 37
Pouring and running methods for . . . 31
precision casting, in moist investment molds . . . 460-464
pressure die castings . . . 34
sand castings . . . 34
Titanium for grain refining . . . 24, 29, 37
quality casting . . . 36
Aluminum alloy:
aging characteristics . . . 339
aging properties . . . 525
analyses . . . 21, 24, 25, 33
brazing characteristics . . . 340
casting characteristics . . . 340
castings . . . 20
composition . . . 339
corrosion resistance . . . 337, 341
Effect of copper content on . . . 339
Effect of magnesium content on . . . 338
Effect of silicon content on . . . 338
Mechanical properties of . . . 339
melting and fluxing . . . 719
Microstructure of . . . 72-75
Aluminum alloys:
Aging characteristics of . . . 335
Brazing characteristics of . . . 336
Composition and properties of . . . 70-74
Effect of iron content on . . . 334, 337
Effect of magnesium content on . . . 333
Effect of silicon content on . . . 334
Effect of zinc content on . . . 333
Heat treatment of . . . 71
Aluminum-base casting alloys, History of . . . 333
Aluminum casting alloy for permanent molding . . . 337
Aluminum casting alloys . . . 69
Al-Zn-Mg-Cu casting alloys, Characteristics of . . . 333
Al-Zn-Mg-Cu casting alloy, Corrosion properties of . . . 525-529
Annealing cycles for malleable irons . . . 285
Annealing, malleable, Furnace atmosphere for . . . 365-375
Annealing nodular iron . . . 298
Annealing of white cast iron, Quantitative effects of some factors on . . . 202
Authority, Levels of . . . 627
Analysis of malleable iron . . . 578
Autoclave, Removal of wax pattern in investment casting in . . . 461
Appearance of steel castings, Influence of temperature on fluidity and surface . . . 261
Apprentice training . . . 515-524
Apprentice training schedule . . . 516
Apron conveyors in cleaning room . . . 552
Arbitration bars, Gating and dimension of . . . 157
Arbitration bars, Mechanical testing of . . . 159
Atmosphere, Furnace, for malleable annealing . . . 365-375

B

Bakability of cores . . . 561
Baked tensile strength of cores . . . 444, 560
Baking time and temperature, Effect of, on baked tensile strength of cores . . . 440
Balance-blast type cupola . . . 6
Bank sand . . . 52
Base-exchange reactions, Treatment of clays by . . . 492
Basic electric heats . . . 473, 474
Basic electric steel . . . 533
Basic furnace, Manganese reaction in . . . 471
Basic-lined cupola for iron melting . . . 376-392
Bandsawing in foundries . . . 621-625
Belt conveyors in cleaning room . . . 552
Bench coremaking, Standard data for . . . 503-509
Bentonite, Southern . . . 415
Bessemer converter, Blowing steel in . . . 1, 2
Bibilography on nodular iron . . . 647, 648
Bibliography on tin bronze . . . 258
Binders and additives, Effect of, on hot strength of molding sands . . . 411-422
Binders, core, Phenolic resin for . . . 439-449
Bleed-off test . . . 597, 600
Bleeding method for solidification studies . . . 273
Blow defects . . . 60
Blower capacity for cupola . . . 2
Bondability of sand . . . 651, 653
Bond clays, Treatment of, for foundry sand . . . 492-502
Borax for refining aluminum grain . . . 29
Bottom-pour ladles . . . 361
Brackelburg furnace . . . 68
Brass:
commercial yellow. Optimum aluminum additions in . . . 423-428
85-5-5-5 red, Melt quality and fracture characteristics of . . . 122-132
Brass, Fracture test from:
high quality, melts . . . 123
intermediate quality melts . . . 124
low quality melts . . . 124
Brass melting practice and fracture appearance . . . 124
Brass and bronze specifications . . . 208
Brass, yellow, Castability tests for . . . 424, 425

SUBJECT INDEX

A

Abrasive:
costs . . . 689
operations in foundry cleaning room . . . 685-691
wheel speeds . . . 687
Abrasives for cleaning castings . . . 455
Acid electric:
heats . . . 472-473
steelmaking, Manganese recovery in . . . 471-491
steel melting practice, Refractory practice in . . . 359
Acid steel practice, Low FeO double slags in . . . 480
Administration of a business . . . 627
A.F.S. Research Reports:
A Study of the Principles of Gating . . . 76-107
Surface Hardening of Pearlitic Malleable Irons . . . 108-121
Melt Quality and Fractures Characteristics of 85-5-5-5 Read Brass . . . 122-132
Tenth Annual Report on the Investigation of Steel Sands At Elevated Temperatures . . . 133-143
Report on A.F.S. Steel Division Research Project . . . 144-146
Influence of Dry Sand Conductivity on Rate of Freezing of Steel Slabs . . . 147-152
Aging charactertistics of aluminum alloys . . . 335, 525
Aging of magnesium alloy . . . 748
Agraphatic carbon in malleable iron . . . 578, 580
Air furnace, Melting in . . . 2
Air tools, Portable, in foundry cleaning rooms . . . 510-514
Airless blast cleaning . . . 450
Albany sand (natural clay bond) . . . 415
Alloy for pattern shops . . . 718-719
Alloys, Aluminum casting . . . 69
Aluminum:
additions in commercial yellow brass . . . 423-428
Boron for grain refining . . . 29
British casting practice . . . 20
Centrifugal casting . . . 35
Degasification of . . . 27
fluxes . . . 28
grain refinement mechanism . . . 28, 30
Gravity die (permanent mold) casting . . . 33
heat treatment . . . 34, 35
Hexachlorethane for grain refinement . . . 29
melting furnace . . . 30
melting practice . . . 26
Niobium for grain refining . . . 24, 29, 37
Pouring and running methods for . . . 31
precision casting, in moist investment molds . . . 460-464
pressure die castings . . . 34
sand castings . . . 34
Titanium for grain refining . . . 24, 29, 37
quality casting . . . 36
Aluminum alloy:
aging characteristics . . . 339
aging properties . . . 525
analyses . . . 21, 24, 25, 33
brazing characteristics . . . 340
casting characteristics . . . 340
castings . . . 20
composition . . . 339
corrosion resistance . . . 337, 341
Effect of copper content on . . . 339
Effect of magnesium content on . . . 338
Effect of silicon content on . . . 338
Mechanical properties of . . . 339
melting and fluxing . . . 719
Microstructure of . . . 72-75
Aluminum alloys:
Aging characteristics of . . . 335
Brazing characteristics of . . . 336
Composition and properties of . . . 70-74
Effect of iron content on . . . 334, 337
Effect of magnesium content on . . . 333
Effect of silicon content on . . . 334
Effect of zinc content on . . . 333
Heat treatment of . . . 71
Aluminum-base casting alloys, History of . . . 333
Aluminum casting alloy for permanent molding . . . 337
Aluminum casting alloys . . . 69
Al-Zn-Mg-Cu casting alloys, Characteristics of . . . 333
Al-Zn-Mg-Cu casting alloy, Corrosion properties of . . . 525-529
Annealing cycles for malleable irons . . . 285
Annealing, malleable, Furnace atmosphere for . . . 365-375
Annealing nodular iron . . . 298
Annealing of white cast iron, Quantitative effects of some factors on . . . 202
Authority, Levels of . . . 627
Analysis of malleable iron . . . 578
Autoclave, Removal of wax pattern in investment casting in . . . 461
Appearance of steel castings, Influence of temperature on fluidity and surface . . . 261
Apprentice training . . . 515-524
Apprentice training schedule . . . 516
Apron conveyors in cleaning room . . . 552
Arbitration bars, Gating and dimension of . . . 157
Arbitration bars, Mechanical testing of . . . 159
Atmosphere, Furnace, for malleable annealing . . . 365-375

B

Bakability of cores . . . 561
Baked tensile strength of cores . . . 444, 560
Baking time and temperature, Effect of, on baked tensile strength of cores . . . 440
Balance-blast type cupola . . . 6
Bank sand . . . 52
Base-exchange reactions, Treatment of clays by . . . 492
Basic electric heats . . . 473, 474
Basic electric steel . . . 533
Basic furnace, Manganese reaction in . . . 471
Basic-lined cupola for iron melting . . . 376-392
Bandsawing in foundries . . . 621-625
Belt conveyors in cleaning room . . . 552
Bench coremaking, Standard data for . . . 503-509
Bentonite, Southern . . . 415
Bessemer converter, Blowing steel in . . . 1, 2
Bibilography on nodular iron . . . 647, 648
Bibliography on tin bronze . . . 258
Binders and additives, Effect of, on hot strength of molding sands . . . 411-422
Binders, core, Phenolic resin for . . . 439-449
Bleed-off test . . . 597, 600
Bleeding method for solidification studies . . . 273
Blow defects . . . 60
Blower capacity for cupola . . . 2
Bondability of sand . . . 651, 653
Bond clays, Treatment of, for foundry sand . . . 492-502
Borax for refining aluminum grain . . . 29
Bottom-pour ladles . . . 361
Brackelburg furnace . . . 68
Brass:
commercial yellow. Optimum aluminum additions in . . . 423-428
85-5-5-5 red, Melt quality and fracture characteristics of . . . 122-132
Brass, Fracture test from:
high quality, melts . . . 123
intermediate quality melts . . . 124
low quality melts . . . 124
Brass melting practice and fracture appearance . . . 124
Brass and bronze specifications . . . 208
Brass, yellow, Castability tests for . . . 424, 425

Brass, yellow, tensile properties of, Effect of aluminum content on . . . 424
Bronze and brass specifications . . . 208
Bronze melting in cupola . . . 2
Brazing characteristics of aluminum alloy . . . 336, 340
Bronze, tin:
Density of . . . 230
Effect of superheating and casting temperatures on . 229-260
Solidification mechanism of . . . 231
Britsh aluminum casting practice . . . 20
Business, Administration of . . . 627
Burnout of investment molds . . . 464

C

Calibration of sand testing equipment . . . 615
Carbon control in cupola operation . . . 9-17
Carbon equivalent . . . 316-319
Calculation of . . . 10
Carbon inoculation and chlorine treatment of magnesium 734
Carbon monoxide cause of pinholes in steel castings . . 395
Carbon pickup in cupola operation . . . 5-18
Carbon, total, Increase of, in cupola melting . . . 1
Cast iron, Relaxation of . . . 456-459
Castability tests for yellow brass . . . 424-425
Casting characteristics of aluminum alloy . . . 340
Casting temperatures, Effect of, on tin bronzes . . . 229-260
Centrifugal casting aluminum . . . 35
Cereal and resin efficiency at optimum moisture. Comparison of . . . 445
Carcoal pig iron . . . 705
Charge, cupola . . . 1
Charging bucket for cupola:
cone-bottom . . . 6
drop-bottom . . . 6
Charts, Organization . . . 629-634
Chemical changes occurring in cupola melting . . . 1
Chemical composition of cupola iron, Effect of moisture in air blast on . . . 5
Chill mold method of hardness carbon test . . . 534
Chipping hammers, Use of . . . 510
Clay-bonded foundry sands . . . 402-502
Clay content of foundry sand . . . 56
Clay content, Effect of, on Western bentonite sand mixtures 414
Clays, bond, Treatment of, for foundry sand . . . 492-502
Clays, Lawrence . . . 493-498
Clays, Mississippi bentonite . . . 493-498
Cleaning room equipment, Selection and application of 450-455
Cleaning rooms, Use of portable air tools in foundry . . 510-514
Cleaning room, Material transport in . . . 550-556
Cleaning room abrasive operations . . . 685-691
Coal (anthracite) as fuel in cupola . . . 12
Coke igniter, Electric, for cupola . . . 2
Coke, Properties of . . . 381
Cold formed flexible "precision" patterns and core boxes 675-679
Columnar crystallization zone . . . 272
Committee Reports:
Improved Test Bars for Standard and Ductile Grades of Cast Iron . . . 153-168
Fatigue Data Summary . . . 169-173
Reproducibility of Foundry Sand Tests . . . 611-620
Composition of cupola charge . . . 3, 13
Composition and properties of gray iron . . . 312
Composition tests for steel melter . . . 530-536
Compression, Dry, test for sand . . . 613
Compression, Green, test for sand . . . 612
Conductivity, dry sand, Influence of, on rate of freezing of steel slabs . . . 147
Conductivity of liquid and solid steel . . . 147
Conductivity of sand . . . 147
Continuous melting in cupola . . . 1
Controlled sand produces quality castings . . . 52
Converter, Tropenas . . . 65-66
Conveyors in cleaning room . . . 552
Apron . . . 552
Belt . . . 552
Oscillating . . . 552
Roller . . . 552
Trolley . . . 552
Copper and bronze melting in cupola . . . 2
Core sand mix . . . 61
Coremaking, bench, Standard data for . . . 503-509
Coremaking timestudies . . . 503
Cope and drag flexible plates . . . 677
Cope and drag patterns . . . 701
Core bakability . . . 561
Core binders, Phenolic resin . . . 439-449
Core box, Booked-type . . . 702
Core boxes and patterns, Cold formed flexible "precision" 675-679
Core composition, Effect of, on physical properties of cores . . . 439-449
Core composition, Effect of, on properties . . . 440
Core green strength . . . 441
Core hardness . . . 562
Core properties, Effect of kerosene on . . . 447
Core sand for magnesium in Canada . . . 732
Core sand mixtures, Effect of moisture on . . . 557-563
Core temperature measurement . . . 598
Core wash, Effect of, on metal penetration . . . 601
Cores, Baked tensile strength of . . . 444
Cores, Metal penetration in steel sand . . . 595-603
Corn flour. Gelatinized, in sand mixture . . . 416
Corrosion properties of Al-Zn-Mg-Cu casting alloy . . 525-529
Corrosion resistance of aluminum alloys . . . 337, 341
Cost card . . . 713
Cost factors . . . 710
Cost system, Need for . . . 712
Costs, Management views . . . 710-714
Cradle furnace for iron melting . . . 64
Creep limit of magnesium alloys . . . 406
Cupola air blast moisture content . . . 4
Cupola, Basic-lined, for iron melting . . . 376-392
Cupola bed practice . . . 2
Cupola charges, Making up of . . . 4
Cupola charge, Weighing of . . . 3
Cupola, Front-slagging . . . 6, 7
Cupola, Mechanical charging of . . . 6
Cupola, Operating of . . . 1-20
Cupola types and sizes . . . 64

D

Deep etching of steel castings . . . 145
Defects, Casting, due to sand properties . . . 62
Defects, surface, Magnetic testing for . . . 696
Definitions:
Bondability . . . 653
Flowability . . . 650, 654
Investment casting . . . 38
Rankine temperature scale . . . 150
Sand . . . 52
Ventability . . . 653
Deformation test for sand . . . 614
Degasification of aluminum alloys . . . 27
Degassing magnesium alloy melts . . . 715-717
Density of liquid and solid steel . . . 147
Density of molding sand, Factors affecting . . . 217-228
Density of sand . . . 147
Deoxidizing nickel . . . 721
Deoxidation of tin bronzes with phosphor-copper . . . 229-260
Deoxidizing additions, Effects of, on foundry malleable irons . . . 277-297
Depreciation, Machinery . . . 711
Design, Gating . . . 661-668
Design of bronze test bars . . . 230
Desulphurization of iron . . . 382-383
Density of gun metal . . . 250
Density of tin bronze castings . . . 230
Dextrine in sand mixture . . . 416
Diffraction patterns, X-ray, of silica sand and bentonite . 572
Dilatometer studies of nodular cast iron . . . 637-649
Drop machine . . . 699-700
Dry shear test for foundry sand . . . 613
Dry compression test for sand . . . 613
Dry permeability test for sand . . . 612
Dumping method for solidification studies . . . 273
Dressing and truing abrasive wheels . . . 688

Dry sand conductivity, Influence of, on rate of freezing of steel slabs . . . 147
Ductile cast iron . . . 1
Ductile iron:
Mechanical properties of . . . 160-161
Microstructure of . . . 164
Problems in producing . . . 705-709
Test bars for . . . 153
Transverse properties of . . . 166
Dune sand . . . 52
Duplex process for malleable iron . . . 2
Duplexing process . . . 67

E

Economics of use of matchplates . . . 701
Electric moisture test for sand . . . 55
Electrodes, Graphite, as fuel in cupola . . . 12
Electronic hardness tester for castings . . . 697-698
Engineering student and summer foundry work . . . 680-684
Equipment for degassing magnesium allow melts . . . 715-717
Etching, Deep acid, of iron test specimens . . . 159
Exchange papers:
Aluminum Alloy Casting. A Review of British Achievements . . . 20-37
Formation of Technical Management Groups for French Foundry Industry . . . 739-741
Nonferrous Investment Casting . . . 38-51
Controlled Sand Products Quality Castings . . . 52-62
Ferrous Melting Furnaces in the United States and Canada . . . 63-68
Trends in Aluminum Casting Alloys . . . 69-75
Exographs of gun metal . . . 257
Expansion of molding sand, Factors affecting . . . 217
Expansion of plastics . . . 434

F

Facing, Heavy, sand mix . . . 59
Facing, Light, sand mix . . . 59
Fatigue data summary . . . 169
Fayalite, Identification of . . . 565
Fayalite reaction in sand molds for steel castings . . . 564-577
FeO SiO_2 equilibrium diagram . . . 567
Feeder head insulators, Use of . . . 723
Ferrochromium addition in cupola operation . . . 9
Ferrous melting furnaces . . . 63
Ferrosilicon, Addition of, in cupola operation . . . 6, 9
Ferrostatic pressure, Effect of, on penetration . . . 596-598
Filling and ramming mold . . . 504
Finger gating systems, Molten metal flow from . . . 661-668
Finished iron inspection . . . 695
Finishing magnesium castings in Canada . . . 735
Fire clay, Ohio . . . 416
First-stage annealing of nodular iron . . . 300, 309
First-stage heat treatment of malleable iron . . . 581
Flame hardening pearlitic malleable . . . 113-121
Flexible pattern equipment, Properties of . . . 676
Flexible "precision" patterns and core boxes, Cold formed 675-679
Flowability:
control . . . 656
of molding sands . . . 650-660
of sand defined . . . 650-654
Sand . . . 61
Fluxes for aluminum alloys . . . 28
Fluidity, slag, Effect of . . . 484
Fluidity and surface appearance of steel castings, Influence of temperature on . . . 261
Fluidity tests for steel . . . 263
Fluxes, Solid, for magnesium in Canada . . . 733
Follow boards . . . 676
Forehearth, Cupola . . . 9
Foundry sand tests, Reproducibility of . . . 611-620
Fracture characteristics and melt quality of 85-5-5-5 red brass . . . 122
Fracture of malleable sprue test bars . . . 285
Fracture test for brass, Suggested procedure for . . . 130
Fracture of brass and bronze, Interpreting . . . 216
Fractures of red brass. Interpreting of . . . 130
Fractures, test bar, Steel quality as related to . . . 537-549
Freezing of steel slabs, Influence of dry sand conductivity on rate of . . . 147
French foundry industry, Technical management groups for . . . 739-741
Front-slagging cupola . . . 6, 7
Fuel in cupola practice . . . 10
Furnace, air, Melting in . . . 2
Furnace atmosphere for malleable annealing . . . 365-375
Furnaces, High frequency induction . . . 67

G

Gases, Nature of mold cavity . . . 584-594
Gated pattern . . . 699
Gates and runners, Design of . . . 77
Gating:
Design . . . 661-668
Practice for investment casting . . . 44-51
Principles of . . . 76
Systems, Study of . . . 100
Gating and risering
Magnesium castings in Canada . . . 732
Practice as related to feeding . . . 190
Gelatinized corn flours in sand mixture . . . 416
Goals of business . . . 627
Gouging by flame cutting . . . 354
Grain fineness of foundry sand . . . 57
Grain refinement of aluminum alloys . . . 28-30
Grain refinement mechanism for aluminum . . . 30
Graphite mold washes and coatings . . . 723
Graphite molds . . . 723
Graphitization of malleable iron . . . 285
Graphitization, Subcritical isothermal . . . 578-583
Graphitization, Subcritical, of malleable iron . . . 289
Gravity die (permanent-mold) aluminum castings . . . 33
Gray iron, Composition and properties of . . . 312
Gray iron, Sand mix for . . . 156-157
Gray irons, Correlation of properties of . . . 323
Green compressive strength of foundry sand . . . 56
Green compression test for foundry sand . . . 612
Grain fineness and screen distribution, Effect of, on penetration . . . 600
Green permeability test for sand . . . 612
Green strength of cores . . . 441, 560
Green strength of sand . . . 617
Grind inspection . . . 695
Grinder, Portable . . . 689
Grinders, pneumatic, Use of . . . 512
Gun metal
Chemical analyses of . . . 244
Effect of tapping and pouring temperatures on properties of . . . 245
Properties, as affected by melting unit, tapping and casting temperatures and deoxidation . . . 235-240
Solidification mechanism . . . 257
Gypsum cement, use of in matchplate making . . . 198

H

Hardenability, Tensile strength estimated from . . . 530
Hardening, Surface, pearlitic malleable . . . 108
Hardness carbon test for steel . . . 533
Hardness tester, Electronic, for malleable castings . . . 697-698
Hardness testing of malleable castings . . . 696
Hardness of core . . . 562
Heat losses . . . 466-469
Heat, Nature of . . . 465
Heat transfer . . . 466
Heat treatment of
Aluminum castings . . . 34, 35
Magnesium castings . . . 735, 747
Malleable iron castings . . . 580
Hexachlorethane addition to magnesium . . . 734
Hexachlorethane for aluminum grain refining . . . 29
High frequency induction furnaces . . . 67
Hot tears in steel castings . . . 144
Hoyt, Charles Edgar, annual lecture . . . 1
Hot strength of molding sands, Effect of various binders and additives on . . . 411-422
Humidifying heater for moisture control in cupola operation 5

Hydrogen as cause of pinholes in steel castings 393
Hydrogen clays 499
Hydromechanics of liquid metal flow 666
Hydrostatic pressure resistance of gun metal 249-253
Hydrostatic pressure test for tin bronze 229

I

Igniter, Electric coke for cupola 2
Incentive, Wage, administration 604-610
Induction hardening pearlitic malleable iron 113-120
Ingots, Solidification of 270
Injection molding conditions for pattern plastic for investment casting 434
Inoculants, Addition of, in cupola operation 9
Inspection
  Department organization 692
  Finished iron 695
  Grind 695
  Magnesium castings, in Canada 735
  Pearlitic malleable castings 692-698
  Visual 696
  White Iron 695
Insulators, feeder head, Use of 723
Integrally cast matchplates 700
Interdendritic microshrinkage in tin bronze 229
Interface (sand-mold) product, Formation of 566
Interface reactions
  Effect of elements dissolved in steel on 567-571
  Effect of gas atmospheres on 567-571
  Effect of iron vapor pressure in mold on 567-571
  Effect of sand additions on 567-571
  Skin formation at casting surface 567-571
Investment casting
  Aluminum, Microstructures of 463
  Defined 38
  Metallurgical considerations 46
  Nonferrous 38
  Pattern materials 39
  Plastic patterns 40
  Plastics for 431-433
  Waxes for 429
Investment materials for investment casting 42
Investment molds, Burnout of 464
Investment molds, Precision casting aluminum in moist . 460-464
Investment mold vacuum treatments 463
Investment, precision, casting, Pattern materials for . . 429-438
Iron-carbon-silicon alloys 312
Iron melting, Basic-lined cupola for 376-392
Iron oxide in a sand mixture 418
Iron-oxygen equilibrium diagram 567
Isothermal graphitization, Subcritical 578-583

K

Kerosene, Effect of, on core properties 447
Kathabar moisture control in cupola operation 4, 5
Kaolin, White 415
Keel block pattern 211

L

Ladle lining 361
Ladle, Teapot 9
Levels of authority 627
Lignin binders 497, 501
Lignin in sand mixtures 417
Lining the ladle 361
Lithium chloride solution for water vapor in cupola operation 6
Load-deformation testing of steel sands 134
Loose pattern (solid) 699
Loose pattern (split) 699
Lucite mold in gating study 76

M

Machined test bars from magnesium castings, Tensile properties of 406
Machinery depreciation 711
Macrographs of gun metal 233, 234
Macrostructure of gun metal 246
Magnesium alloy melts, Degassing 715-717
Magnesium additions for deoxidizing nickel 721
Magnesium alloys
  Analyses of 405
  Creep limit of 406
  Grain size of 405
  Heat treatment of 405
  Tensile properties of 405
Magnesium casting alloy ZK61 742-751
Magnesium castings
  Finishing of, in Canada 735
  Heat treatment of, in Canada 735
  Inspection of, in Canada 735
Magnesium foundry practice in Canada 729-738
Magnesium fluxes, Solid, used in Canada 733
Magnesium melting in Canada 733
Magnesium-rare earth-zirconium alloys, Casting of, in sand molds 400-410
Magnesium refining in Canada 733
Magnesium superheating in Canada 733
Magnetic testing for surface defects 696
Malleable annealing, Furnace atmosphere for 365-375
Malleable castings, pearlitic, Inspection of 692-698
Malleable iron
  analysis 578
  annealing cycles 285
  carbon content 205
  composition 202, 278
  Effects of deoxidizing additions on 277, 289
  Cooling rate of 202
  deoxidation 205, 294, 295
  First-stage heat treatment of 581
  heat treatment 580
  industry 67
  graphitization 285
  melting and casting practice 202
  microstructure 579-582, 286, 289
  Nonmetallic inclusions in 277-290
  Physical properties of 288
  Residual phase in 287
  Second-stage heat treatment of 582
  section size 206
  silicon content 205
  Soaking temperature 203
  Subcritical graphitization of 289
Malleable, pearlitic, surface hardening 108
Management groups for French foundry industry . . . 739-741
Management, Organizing, for profit 626-636
Management organization 627
Management, Principles of good 628
Management views costs 710-714
Manganese content, Effect of, on nodular iron 305
Manganese reaction in basic furnace 471
Manganese recovery in acid electric steelmaking . . . 471-491
Matchplate, Production patterns and the 699-704
Matchplates, Technique of producing pressure cast aluminum 198
Material transport in the cleaning room 550-556
Materials handling equipment advantages and disadvantages 554
Materials handling equipment, Factors influencing choice of 554
Maurer diagram 312, 313
Mechanical charging of cupola 6, 64
Mechanical properties of ductile iron 160, 161
Mechanical testing of cast iron arbitration bars 159
Mechanism of bronze solidification 231
Melt quality and fracture characteristics of 85-5-5-5 red brass 122
Melt quality of red brass, Standards of 122
Melter, steel, Metal composition tests for 530-536
Melting and casting high purity nickel 720-728
Melting and fluxing aluminum alloy 719
Melting conditions, Effect of, on gun metal 246
Melting furnaces for aluminum 30
Melting iron, Basic-lined cupola for 376-392
Melting magnesium in Canada 733
Melting metal for investment casting 45
Melting, metal, Thermodynamics of 465-470
Melting practice for aluminum alloys 26
Metal composition tests for steel melter 530-536
Metal flow, Resistance of, in mold 77

Metal flow, Velocity of, in mold 77
Metal melting 465-470
Metal patterns for investment casting 436
Metal penetration in steel sand cores 595-603
Micrographs of gun metal 237-252
Microradiographs of gun metal 249, 255, 256
Microshrinkage in tin bronze 229
Microstructure of
gun metal 249
malleable irons 286, 289, 579-582
nodular iron 299-305, 639-645
pearlitic malleable irons 110-113
Mineral wool, Manufacture of, in cupola 2
Mischmetal 400
Mixing of foundry sand 558
Mixtures, core sand, Effect of moisture on 557-563
Moisture content in air blast, Effect of, on temperature and chemical composition of cupola iron 5
Moisture content of cupola air blast 4
Moisture control in sand 55
Moisture tester, Speedy, for sand 617
Moisture tests 611
Moisture test, Rapid, for sand 617
Mold cavity gases, Nature of 584-594
Mold-metal interface reactions, Theoretical considerations of 574
Molds, Handling of, in investment casting 436
Molding sand 52
factors affecting 217
for magnesium in Canada 731
flowability of 650-660
standard 611
Molding sands, Effect of various binders and additions of hot strength of 411-422
Mottled iron zone 315
Monorail light duty cranes and lift trucks 552
Mullers, Comparison of laboratory and production 447
Mulling time, Effect of, on baked tensile strength of cores . . 439
Multitable-type cleaning machine 451

N

Newton's laws 105
Nickel, cast, Characteristics of 725
Nickel, high purity, Melting and casting procedures for . 720-728
Nickel, Pouring temperature for 722
Niobium in aluminium 24, 29, 37
Nodular cast iron, Dilatometer studies of 637-649
Nodular cast iron, Problems in producing 705-709
Nodular iron,
Analysis of 299
Annealing 298
Effect of composition on 306, 307
Effect of manganese content on 305
First-stage annealing of 300, 309
High strength 175
Mechanical properties of 304, 308
Microstructures of 179-183, 299-305, 639-645
Second-stage annealing of 302, 307
Nodular size, Section size relationships in 174
Nonferrous investment casting 38
Nonmetallic inclusions in malleable irons 277-290

O

Ohio fire clay 415
Organization, Basic steps in setting up a sound 627
Organization charts 629-634
Organization of management 626-636
Organization, Planning the 628
Organizational structure of inspection department 692
Oscillating conveyors in cleaning room 552
Oven method of moisture determination in sand 55
Overhead account 711
Oxygen cutting processes in steel foundries 346

P

Pattern
equipment, Types of 699
materials for investment casting 39
materials for precision investment casting 429-438
mounted on a plate 700
Production, and the matchplate 699-704
shops, Alloy for 718-719
Patterns and core boxes, Cold formed flexible "precision" 675-679
Patterns for magnesium practice in Canada 731
Pearlitic gray iron zone 316
Pearlitic malleable
castings, Inspection of 692-698
iron properties 109
surface hardening 108
Penetration, Effect of
core wash on 601
ferrostatic pressure on 596-598
grain fineness and screen distribution on 600
pouring temperature on 596, 597
ramming on 596, 597
wood flour on 601
Penetration, metal, in steel sand cores 595-603
Permanent mold aluminum casting alloy 337
Permeability, green, Test for sand 612
Permeability, Green, of core 559
Permeability of foundry sand 617, 618, 56
Permeability, Test for dry sand 612
Phenolic resin core binders 439-449
Phosphor-copper deoxidation of tin bronzes 229-260
Physical properties of, Effect of superheating and casting temperatures on, tin bronzes 229-260
Physical properties of malleable irons 288
Pickling of castings 452
Pig iron
Charcoal 705
Low-phosphorus coke 705
Pig iron, Analysis of 3
Pin test method of hardness carbon test 534
Pinhole formation in steel castings, Thermodynamics of . 393-399
Pitch in sand mixture 417
Plastic patterns for investment casting 40
Plaster properties in patterning 675
Plaster, Use of formulated metal casting, in matchplate industry 703
Plaster, Use of, in matchplate making 198
Plastic pattern for investment casting, Properties of . . . 433
Plastics for investment casting 431-433
Pneumatic grinders, Use of 512
Polysterene patterns for investment casting 40
Pouring metal for investment casting 45
Pouring range for steel casting 145
Pouring and running methods for aluminum 31
Pouring temperature, Effect of, on metal penetration 596, 597
Pouring temperature for nickel 722
Powder cutting in steel foundry 355, 356
Powder-washing in steel foundry 357
Precision casting aluminium in moist investment molds . 460-464
Precision investment casting, Pattern materials for . . . 429-438
Pressure die casting aluminum 34
Principles of good management 628
Profit, Organizing management for 626-636
Properties and composition of gray iron 312
Properties of gray irons, Correlation of 323
Properties of nodular iron 304, 308
Properties of pattern plastic for investment casting . . . 433
Properties of tin bronze, Effect of superheating and casting temperature on 229-260
Pyrometer, portable optical, Use of 261

Q

Quality casting of aluminum 36
Quality, Steel, as related to test bar fractures 537-549

R

Radiograph of:
aluminum casting 94, 96, 98
steel casting 186-188
Rammer, Sand 618
Rammer, sand, Test on 614
Ramming, Effect of, on metal penetration 596, 597
Rankine temperature scale defined 150
Rapid moisture test for sand 617
Rapid moisture teller method of sand moisture determination 55
Rare earth alloys 400-410

Rayotube, Use of . . . 261
Refining magnesium in Canada . . . 733
Refractory pattern coating in investment casting . . . 462
Refractory practice in acid electric steel melting . . . 359
Refractory storage . . . 362
Relaxation of cast iron . . . 456-459
Reproducibility of foundry sand tests . . . 611-620
Residual phase in malleable irons . . . 287
Residual stress pattern in plastics . . . 436
Resin and cereal efficiency at optimum moisture, Comparison of . . . 445
Riser size, Effect of, on feeding . . . 190
Risers, Cutting of, with oxygen flame . . . 348-354
Roller conveyors in cleaning room . . . 552
Rough grinding operations . . . 685

S

Salvage of castings by welding . . . 669-674
Sampling, Method of, of brass and bronze . . . 216
Sampling of sand. Precautions for . . . 58
Sand:
  Bank . . . 52
  Dune . . . 52
  Molding . . . 52
  Silica . . . 52
Sand, Albany (natural clay bond) . . . 415
Sand, Treatment of bond clays for foundry . . . 492-502
Sand bondability . . . 651, 652
Sand casting aluminum . . . 34
Sand, Conductivity of . . . 147
Sand defined . . . 52
Sand, Density of . . . 147
Sand, Foundry, classification . . . 52
Sand, Foundry, how used . . . 53
Sand, foundry, Production of . . . 554
Sand impact tester . . . 616
Sand mix for gray iron . . . 156, 157
Sand mix for light gray iron castings . . . 60
Sand, Mixing of . . . 558
Sand mixtures, core, Effect of moisture on . . . 557-563
Sand, Molding, properties vs moisture . . . 55
Sand rammer . . . 618
Sand rammer, Test on . . . 614
Sand properties, Control of . . . 55
Sand, Standard molding . . . 611
Sand testing equipment . . . 614, 615
Sand testing equipment illustrated . . . 54
Sand moldability . . . 651
Sandblast . . . 451
Sands, Segregation of . . . 557
Sand testing equipment, Calibration and maintenance of 615
Sand testing procedure . . . 611-613
Sand tests for:
  deformation and toughness . . . 614
  dry compression and shear . . . 613
  dry permeability . . . 612
  green compression . . . 612
  green permeability . . . 612
  green shear . . . 613
Sand tests, Reproducibility of foundry . . . 611-620
Sands, molding, Flowability of . . . 650-660
Sawing of gates . . . 621-625
Scrap, Composition of . . . 3
Screen distibution, Effect of, on metal penetration . . . 600
Second-stage annealing nodular iron . . . 302, 307
Second-stage heat treatment of malleable iron . . . 582
Segregation of sands . . . 557
Shear, dry, Test for sand . . . 613
Shot, Cast iron and cast steel . . . 455
Shrinkage of molding sand, Factors affecting . . . 217
Single slag heats, Normal manganese range in . . . 471
Skin formation at casting surface . . . 567
Side blow converter . . . 65, 66
Silica sand . . . 52
Single slag practice, Control of slag composition in . . . 485
Single slag practice, higher manganese steel . . . 476
Sinter layer on steel casting . . . 564
Sinter pin test for fayalite reaction in steel . . . 566
Slag composition . . . 386
  Control of, in single slag practice . . . 485
  in basic dephosphorizing heats . . . 381
  in basic desulphurizing heats . . . 390
Slag in melting nickel . . . 722
Slag, cupola, Depth of layer of . . . 8
Slag fluidity, Effect of . . . 484
Slicking mold . . . 507
Snagging operations . . . 685
Specific gravity of gun metal . . . 254
Solidification characteristics, Effect of superheating and casting temperatures on, of tin bronzes . . . 229-260
Solidification, Mechanism of, of bronze . . . 231
Solidification mechanism of gun metal . . . 257
Solidification of molten metals . . . 270
Soundness of cast steel plates, Riser and chill edge effect of 185
Southern bentonite . . . 415
Specific heat of liquid and solid steel . . . 147
Specifications for brass and bronze . . . 208
Spectrometer, x-ray, Description of . . . 571
Speedy moisture test for sand . . . 55
Speedy moisture tester for sand . . . 617
Split box assembly . . . 508
Soda ash, Use of, in cupola practice . . . 2, 7, 9
Sprue base, Design of . . . 76, 88
Sprue size, Effect of . . . 78
Sprue test for malleable iron . . . 284
Stand grinder . . . 687
Standard data for bench coremaking . . . 503-509
Standard molding sand . . . 611
Steel castings:
  Fayalite reaction in sand molds for . . . 564-577
  Influence of temperature on fluidity and surface appearance of . . . 261
  Sinter layer on . . . 564
  Thermodynamic study of pinhole formation in . . . 393-399
Steel:
  Conductivity of . . . 147
  Density of . . . 147
  foundries, Oxygen cutting in . . . 346
  foundry melting furnaces . . . 65
  plates, cast, Riser and chill-edge effects to soundness of . 185
  quality as related to test bar fractures . . . 537-549
  Specific heat of . . . 147
Steel melter, Metal composition tests for the . . . 530-536
Steel melting, acid electric, Refractory practice in . . . 359
Steel sand cores, Metal penetration in . . . 595-603
Steel sand mix . . . 59
Steel sand properties at elevated temperature . . . 133
Steelmaking, acid electric, Manganese recovery in . . . 471-492
Strength, Baked tensile, of core . . . 560
Strength, Green, of core . . . 560
Stress corrosion of aluminum alloy . . . 525-529
Stress pattern, Residual, in plastics . . . 436
Stress-strain diagram for steel sands, Effect of loading rate on . . . 134
Strike off operation . . . 507
Student, Engineering, and summer foundry work . . . 680-684
Superheating, Effect of, on tin bronze . . . 229-260
Superheating magnesium in Canada . . . 733
Surface films on investment castings . . . 437
Swing frame grinder . . . 686

T

Table-type cleaning machines . . . 453
Technical management groups for French foundry industry . . . 739-741
Temper carbon form . . . 203
Temperatures, casting, Effect of, on tin bronzes . . . 229-260
Temperature and chemical composition of cupola iron, Effect of moisture in air blast on . . . 5
Temperature measurement, Equipment for . . . 261
Tensile strength estimated from hardenability . . . 530
Test bar, Bronze, design . . . 230
Test bars for standard and ductile cast iron . . . 153
Testing equipment, sand, Calibration and maintenance of 615
Testing, sand, Procedure for . . . 611-613
Test bar fractures, Steel quality as related to . . . 537-549

Tests, foundry sand, Reproducibility of 611-620
Thermal expansion of mold for investment casting . . . 436
Thermal gradients in steel plate castings 191
Thermodynamic study of pinhole formation in steel castings 393-399
Thermodynamics:
Laws of 105
melting nonferrous metals 465-470
Timestudies, Coremaking 503
Timestudy department, Organizing the 606
Timestudy procedure 605
Tin bronzes:
bibliography 258
Density of 230
Effect of superheating and casting temperatures on . 229-260
Titanium, Effects of deoxidation with, on malleable iron . 289
Titanium in aluminum 24, 29, 37
Tolerances, Commercial, in investment casting 38
Tools for apprentices 516
Tools, Use of portable air, in foundry cleaning rooms . 510-514
Training, Foundry apprentice 515-524
Transverse properties of ductile iron 166
Transverse testing of ductile and gray iron 166-167
Triplexing operation 65
Trolley conveyors in cleaning room 552
Tropenas converter 65, 66
Tucking sand 507
Tumbling equipment 451

V

Ventability of sand 651
Ventability of sand defined 653
Vibrator frame 699
Visual inspection of castings 696
Volumteric moisture test for sand 55

W

Wage incentive administration 604-610
Wax patterns for investment casting 39
Waxes for investment casting 429
Washes and coatings for graphite molds 723
Water content, Effect of, on Western bentonite sand mixtures 413
Welding of defects, Salvage of castings by 669-674
Western bentonite mixtures, Properties of 413
Wet blasting 452
White cast iron, Quantitative effects of some factors on the annealing of 202
White iron inspection 695
White iron zone 314
White kaolin 415
Windbox pressure in cupola 8
Wood flour, Effort of, on metal penetration 601
Wood flour in sand mixtures 418
Wood's metal in gating study 76
Workability of molding sand, Factors affecting 217

X

X-ray diffraction patterns of silica sand and bentonite . . 572
X-ray spectrometer, Description of 571

Y

Y-blocks 157
Yellow brass, commercial, Optimum aluminum additions in 423-428
Yellow brass, Castability tests for 424-425

Z

ZK61 magnesium casting alloy 742-751
Zirconium alloys 400-410

AUTHOR INDEX

ACKERLIND, C. G. and MOREY, R. E.—A Study of the Effect of Various Binders and Additives on Hot Strength of Molding Sands 411
ALEXANDER, B. H.—Solidification of Ingots 270
AMES, B. N. and KAHN, N. A.—Effect of Superheating and Casting Temperatures on Physical Properties and Solidification Characteristics of Tin Bronzes 229
ANNICH, M. E.—Fatigue Data Summary 169
ASHBROOK, R. L. and LOCKE, C.—Nature of Mold Cavity Gases 584

BABCOCK, R. S.—Oxygen Cutting Processes in Steel Foundries 346
BAKER, F. M., UPTHEGROVE, C. and ROTE, F. B.— Melt Quality and Fracture Characteristics of 85-5-5-5 Red Brass 122
BAKER, W. O., JOHNSON, W. H. and PELLINI, W. S.—Principles of Gating, Factors Influencing Molten Steel Flow from Finger Gating Systems 661
BALEY, R. F., SCHAUSS, R. P. and WOODLIFF, E. E.—A Study of Factors Affecting Molding Sand Density, Shrinkage, Expansion and Workability 217
BELLEW, G. E.—Salvage of Castings by Welding of Defects 669
BEVIS, B. L. and SHIPLEY, F. W.—Foundry Apprentice Training at Caterpillar Tractor Co. 515
BISHOP, H. F. and PELLINI, W. S.—The Contribution of Riser and Chill-Edge Effects to Soundness of Cast Steel Plates 185
BOGART, H., VENNERHOLM, G. and MELMOTH, R.—Section Size Relationships in Nodular Iron 174
BONSACK, W.—Trends in Aluminum Casting Alloys 69
BOOTH, B. H.—Controlled Sand Produces Quality Castings 52
BOOTH, B. H., ROSENTHAL, P. C. and DIETERT, H. W.—Reproducibility of Foundry Sand Tests 611
BROWN, H.—Nonferrous Investment Casting 38
BUSH, S. H., WOOD, W. P. and ROTE, F. B.—Surface Hardening of Pearlitic Malleable Irons 108

CARTER, S. F.—Basic-Lined Cupola for Iron Melting 376
CARTER, S. F.—Manganese Recovery in Acid Electric Steelmaking 471
COLTON, R. A. and GILBERT, R. H.—Optimum Aluminum Additions in Commercial Yellow Brass 423

DALTON, R. F.—Production Patterns and the Matchplate 699
DICK, J. G.—Metal Specifications for the Brass and Bronze Foundry 208

EASTWOOD, L. W. and GRUBE, K.—A Study of the Principles of Gating 76
ERIKSEN, R., SCHWARTZ, H. A. and HEDBERG, J. D.—Subcritical Isothermal Graphitization 578

FAIRFIELD, H. H., GRAHAM, H. F. and McMEEKIN, A. E.—Metal Composition Tests for the Steel Melter 530
FISHER, G. A. and JOHNSON, H. H.—Steel Quality as Related to Test Bar Fractures 537
FLINN, R. A. and KRAFT, R. W.—Improved Test Bars for Standard and Ductile Grades of Cast Iron 153
FRASER, J. P., THORPE, R. G. and KYLE, P. E.—Tenth Annual Report on the Investigation of Steel Sands at Elevated Temperatures 133

GEORGE, W. E.—Organizing Management for Profit 626
GERTSMAN, S. L. and MURTON, A. E.—An Investigation of Metal Penetration in Steel Sand Cores 595
GILBERT, R. H. and COLTON, R. A.—Optimum Aluminum Additions in Commercial Yellow Brass 423
GOLDSMITH, J. R., ZIEGLER, N. A. and MEINHART, W. L.—Dilatometer Studies of Nodular Cast Iron 637
GRAHAM, H. F., FAIRFIELD, H. H. and McMEEKIN, A. E.—Metal Composition Tests for the Steel Melter 530
GREGG, A. W.—Ferrous Melting Furnaces in the United States and Canada 63
GROBECKER, D. W.—An Investigation of Melting and Casting Procedures for High Purity Nickel 720
GRUBE, K. and EASTWOOD, L. W.—A Study of the Principles of Gating 76

HASSELL, C. T.—Wage Incentive Administration 604
HEDBERG, J. D., SCHWARTZ, H. A. and ERIKSEN, R.—Subcritical Isothermal Graphitization 578
HEINE, R. W.—Some Effects of Deoxidizing Additions on Foundry Malleable Irons 277
HUDSON, F.—Aluminum Alloy Castings, A Review of British Achievement 20
HUNSICKER, H. Y. and SICHA, W. E.—Characteristics of Some Aluminum-Zinc-Magnesium-Copper Casting Alloys 333

JACOBY, R. H. and PETTY, M.—Refractory Practice in Acid Electric Steel Melting 359
JOHNSON, H. H. and FISHER, G. A.—Steel Quality As Related to Test Bar Fractures 537
JOHNSON, W. H., BAKER, W. O. and PELLINI, W. S.—Principles of Gating Design, Factors Influencing Molten Steel Flow From Finger Gating Systems 661
JUROFF, A. J.—Equipment for Degassing Magnesium Alloy Melts 715

KAHN, N. A. and AMES, B. N.—Effect of Superheating and Casting Temperatures on Physical Properties and Solidification Characteristics of Tin Bronzes 229
KRAFT, R. W. and FLINN, R. A.—Improved Test Bars for Standard and Ductile Grades of Cast Iron 153
KRZESZEWSKI, S.—Selection and Application of Cleaning Room Equipment 450
KUNIANSKY, M.—Problems in Producing Ductile Iron 705
KYLE, P. E., THORPE, R. G. and FRASER, J. P.—Tenth Annual Report on the Investigation of Steel Sands at Elevated Temperatures 133

LAIN, M. J.—Formation of Technical Management Groups for French Foundry Industry 739
LEVI, W. W.—Operation of the Cupola 1
LILLIEQVIST, G. A.—Influence of Temperature on Fluidity and Surface Appearance of Steel Castings 261
LIPSON, S. and ROSENTHAL, H.—Precision Casting Aluminum in Moist Investment Molds 460
LOCKE, C. and ASHBROOK, R. L.—Nature of Mold Cavity Gases 584
LOW, S. and MALCOLM, V. T.—Some Tests on Relaxation of Cast Iron 456

MALCOLM, V. T. and LOW, S.—Some Tests on Relaxation of Cast Iron 456
MARTIN, D. T.—Outline of Inspection for Pearlitic Malleable Castings 692
MARTINSON, M.W. and MEIER, J. W.—Magnesium Foundry Practice in Canada 729
MARTINSON, M. W. and MEIER, J. W.—Development of High-Strength Magnesium Casting Alloy ZK61 742
McELWEE, R. G. and SCHNEIDEWIND, R.—Composition and Properties of Gray Iron 312

McElwee, R. G. and Schneidewind, R.—Correlation of Properties of Gray Irons . . . 323
McMeekin, A. E., Fairfield, H. H. and Graham, H. F.—Metal Composition Tests for the Steel Maker . . . 530
McMillan, J. E. and Wickett, J. A.—Phenolic Resin Core Binders, Effect of Core Composition on Physical Properties of Cores . 439
McMillan, W. D.—Furnace Atmosphere for Malleable Annealing . . . 365
Meifr, J. W. and Martinson, M. W.—Magnesium Foundry Practice in Canada . . . 729
Meier, J. W. and Martinson, M. W.—Development of High Strength Magnesium Casting Alloy ZK61 . . . 742
Meinhart, W. L., Ziegler, N. A. and Goldsmith, J. R.—Dilatometer Studies of Nodular Cast Iron . . . 637
Melmoth, R., Vennerholm, G. and Bogart, H.—Section Size Relationships in Nodular Iron . . . 174
Miericke, K. A.—Technique of Producing Pressure Cast Aluminum Matchplates . . . 198
Moore, R. I.—Metal Melting, Application of Thermodynamic Principles to Melting Nonferrous Metals . . . 465
Moore, W. H.—Flowability of Molding Sands . . . 650
Morey, R. E. and Ackerlind, C. G.—A Study of the Effect of Various Binders and Additives on Hot Strength of Molding Sands . 411
Murton, A. E. and Gertsman, S. L.—An Investigation of Metal Penetration in Steel Sand Cores . . . 595
Myers, O. J.—Effect of Moisture on Core Sand Mixtures . . . 557

Nelson, K. E. and Strieter, F. P.—Casting of Magnesium-Rare Earth-Zirconium Alloys in Sand Molds . . . 400

Paschkis, V.—Influence of Dry Sand Conductivity on Rate of Freezing of Steel Slabs . . . 147
Pavlish, A. E.—Treatment of Bond Clays for Foundry Sand . . . 492
Pellini, W. S. and Bishop, H. F.—The Contribution of Riser and Chill-Edge Effects to Soundness of Cast Steel Plates . . . 185
Pellini, W. S., Johnson, W. H. and Baker, W. O.—Principles of Gating Design, Factors Influencing Molten Steel Flow From Finger Gating Systems . . . 661
Petty, M. and Jacoby, R. H.—Refractory Practice in Acid Electric Steel Melting . . . 359

Quadt, R. A. and Reichard, E. C.—Corrosion and Stress Corrosion Properties of a High Strength Aluminum - Zinc - Magnesium - Copper Casting Alloy . . . 525

Rehder, J. E.—An Introduction to the Annealing of Nodular Iron . . . 298
Reichard, E. C. and Quadt, R. A.—Corrosion and Stress Corrosion Properties of a High Strength Aluminum - Zinc - Magnesium - Copper Casting Alloy . . . 525
Ringer, A. G.—Use of Portable Air Tools in Foundry Cleaning Rooms . . . 510
Rosenthal, H. and Lipson, S.—Precision Casting Aluminum in Moist Investment Molds . . . 460
Rosenthal, P. C., Booth, B. H. and Dietert, H. W.—Reproducibilityof Foundry Sand Tests . . . 611
Rote, F. B., Bush, S. H. and Wood, W. P.—Surface Hardening of Pearlitic Malleable Irons . . . 108
Rote, F. B., Baker, F. M. and Upthegrove, C.—Melt Quality and Fracture Characteristics of 85-5-5-5 Red Brass . . . 122

Savage, R. E. and Taylor, H. F.—A Thermodynamic Study of Pinhole Formation in Steel Castings . . . 393
Savage, R. E. and Taylor, H. F.—Fayalite Reaction in Sand Molds Used for Making Steel Castings . . . 564
Schauss, R. P., Baley, R. F. and Woodliff, E. E.—A Study of Factors Affecting Molding Sand Density, Shrinkage, Expansion and Workability . . . 217
Schneidewind, R.—A Summary of the Quantitative Effects of Some Factors on the Annealing of White Cast Iron . . . 202
Schneidewind, R. and McElwee, R. G.—Composition and Properties of Gray Iron . . . 312
Schneidewind, R. and McElwee, R. G.—Correlation of Properties of Gray Irons . . . 323
Schwartz, H. A., Hedberg, J. D. and Eriksen, R.—Subcritical Isothermal Graphitization . . . 578
Sheppard, G. H.—Bandsawing in Foundries . . . 621
Shipley, F. W. and Bevis, B. L.—Foundry Apprentice Training at Caterpillar Tractor Co. . . . 515
Sicha, W. E. and Hunsicker, H. Y.—Characteristics of Some Aluminum-Zinc-Magnesium-Copper Casting Alloys . . . 333
Smith, N. L. and Wolf, R. J.—Material Transport in the Cleaning Room . . . 550
Stickney, N. J.—The Engineering Student and Summer Foundry Work . . . 680
Strieter, F. P. and Nelson, K. E.—Casting of Magnesium-Rare Earth-Zirconium Alloys in Sand Molds . . . 400

Taylor, H. F. and Savage, R. E.—A Thermodynamic Study of Pinhole Formation in Steel Castings . . . 393
Taylor, H. F. and Savage, R. E.—Fayalite Reaction in Sand Molds Used for Making Steel Castings . . . 564
Thorpe, R. G., Kyle, P. E. and Fraser, J. P.—Tenth Annual Report on the Investigation of Steel Sands at Elevated Temperatures 133

Upthegrove, C., Rote, F. B. and Baker, F. M.—Melt Quality and Fracture Characteristics of 85-5-5-5 Red Brass . . . 122

Valyi, E. I.—Pattern Materials and Production in Precision Investment Casting . . . 429
Vennerholm, G., Bogart, H., and Melmouth, R.—Section Size Relationships in Nodular Iron . . . 174

Wagner, J. A.—Management Views Costs . . . 710
Wagner, R. B. and Wiss, J. E.—Cold Formed Flexible "Precision" Patterns and Core Boxes . . . 675
Wickett, J. A. and McMillan, J. E.—Phenolic Resin Core Binders, Effect of Core Composition on Physical Properties of Cores . 439
Williams, H. R.—Standard Data for Bench Coremaking . . . 503
Wiss, J. E. and Wagner, R. B.—Cold Formed Flexible "Precision" Patterns and Core Boxes . . . 675
Wolf, R. J. and Smith, N. L.—Material Transport in the Cleaning Room . . . 550
Wood, W. P., Bush, S. H. and Rote, F. B.—Surface Hardening of Pearlitic Malleable Irons . . . 108
Woodliff, E. E., Schauss, R. P. and Baley, R. F.—A Study of Factors Affecting Molding Sand Density, Shrinkage, Expansion and Workability . . . 217
Work, B. H.—Foundry Cleaning Room Abrasive Operations . . . 685
Wyman, C—Report on A.F.S. Steel Division Research Project . . . 144

Ziegler, N. A., Meinhart, W. L. and Goldsmith, J. R.—Dilatometer Studies of Nodular Cast Iron . . . 637
Zuckor, S.—An Alloy Designed for Pattern Shops . . . 718